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OFFICE OF THE SUPERINTENDENT OF PUBLIC INSTRUCTION - STATE CAPITOL - HELENA, MONTANA



PREFACE

With today's rapidly advancing technological changes, industrial arts programs continue to increase in importance as one part of our effort to offer a complete educational experience for Montana's students. The question of what constitutes a quality industrial arts program gave rise to the need for a comprehensive plan to introduce the subject to students, parents and educators in the state.

Under the guidance of a state committee of teacher educators and staff from this office, workshops were conducted at an industrial arts institute in Helena in 1974 to gather information for the development of a planning guide. Representatives from labor and industry and other citizens concerned with improving industrial arts education provided invaluable perspectives. What resulted was a planning guide for industrial arts that reflects the committee's findings on the needs and experiences that should be offered to prepare students for the increasing influence of industry and technology on their future career choices.

Many people deserve commendation for providing their time, talent, and energy in helping develop the planning guide. Among those were Jeff Wulf, Technical, Trade and Industrial Supervisor, and Mrs. Barbara Crebo, Health Occupations Supervisor, in the Office of the Superintendent of Public Instruction; Ben Ulmer, Ken Minnaert and Alex Capdeville, formerly with the state staff; Albert Vander Linde, Dean of the Vo-Tech Division at Northern Montana College in Havre, and NMC Instructors John Goebel and James Sutich; Ted Diebel, former Dean of Vo-Tech at NMC; Max Amberson, Chairman of the Agriculture and Industrial Education Division at Montana State University in Bozeman, and Douglas Polette, Everett Sheffield and Francis Sprinkle, instructors at MSU; Richard Bollard, formerly with MSU; Clay Anders and Dan Scott, instructors at Western Montana College in Dillon; Bruce King, teacher at Hamilton High School; Terry Bass representing the Montana Power Company in Butte; and, Don Githens of McKnight & McKnight Publishing Company in Denver, Colorado.

Supported by Education Professions Development Act (EPDA) Part F funds, the planning guide will consist of three parts, with part one being an overview or introduction to industrial arts. Parts two and three, incorporating program and curriculum guidelines, currently are being developed. Recognizing that continued cooperation and consultation is necessary and desirable, this planning guide should be considered only as a suggestion for program planning with specific courses of study to be developed by local school boards. Suggestions and additions to the guide will greatly aid us in updating and refining the material so that it offers a comprehensive view of industrial arts education for both now and in the future.

Salous Colling

DOLORES COLBURG
Superintendent of Public Instruction

September 1976

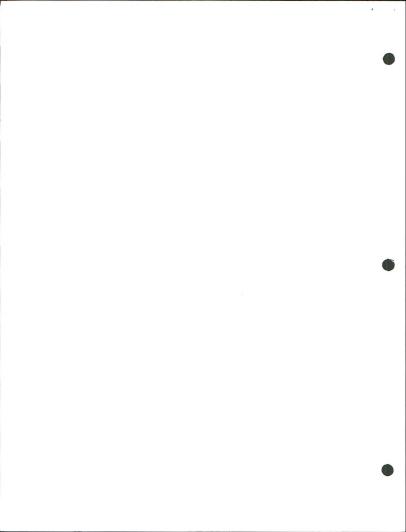


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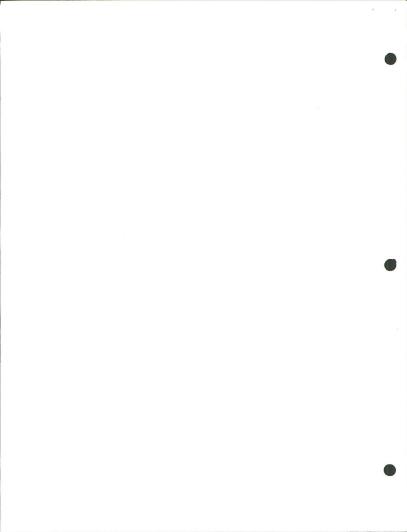


PHILOSOPHY OF INDUSTRIAL ARTS

Industrial arts is that portion of general education which deals with the study of tools, materials, processes, products, and occupations of industry. Industrial arts should be an integral part of the total educational offering of the elementary and secondary schools in Montana. In no other course is the student offered a means of understanding the technological society in which we are presently living. Industrial arts is not designed for specific occupational preparation, but for the exploration of industrial knowledge, industrial methods, hobby interests, and the development of attitudes that will enable individuals to adjust to the duties and responsibilities of a democratic society dominated by the works and products of industry.

Along with the social and individual functions of all general education, industrial arts has several specific functions in providing for a better way of life. Through industrial arts the student receives a realistic orientation into our industrial society through problem solving and by experiences in using the tools, materials and processes used in industry. This allows the student to make wise occupational choices and, consequently, makes a valuable contribution to the total school program. Another service which industrial arts provides the student is the development of basic skills that are needed in countless occupations and professions. Through industrial arts the student gains an understanding of the importance that modern industry plays in our every-day life.

Industrial arts is for all individuals in our society who must, in order to live successfully, deal with the purchasing, consuming, and maintenance of the products of our industrial world. All people, regardless of age, race, sex, or wealth should develop a clear understanding of industry and how to deal with the various problems that it presents in our everyday life. Industrial arts can effectively give them this information.



DEFINITIONS

<u>Vocational Education</u> - an educational program to assist persons in securing the skills, information, attitudes and understanding that will enable them to enter employment in a given occupation or field of work, or to make advancement in that occupation after they have entered it.

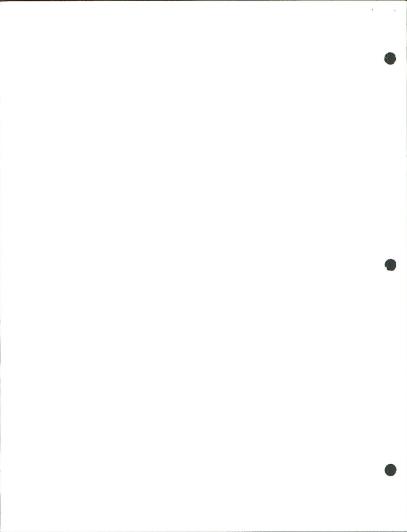
Industrial Arts - those phases of general education which deal with industry its organization, materials, occupations, processes, and products; and with the problems resulting from the industrial and technological nature of society.

Trade and Industrial Education - instruction which is planned to develop basic manipulative skills, safety judgement, technical knowledge, and related occupational information for the purpose of fitting persons for initial employment in industrial occupations and upgrading or retraining workers employed in industry.

<u>Technical Education</u> - education to earn a living in an occupation in which success is dependent largely upon technical skills, information and understanding of the laws of science and principles of technology as applied to modern design, production, distribution, and service.

Industrial Education - a generic term which includes those programs which deal with industry and industrial related processes. This term encompasses industrial arts, trade and industrial education, and technical education.

Career Education - an educational concept to make the classroom experience a meaningful and significant process of learning about all phases of life.

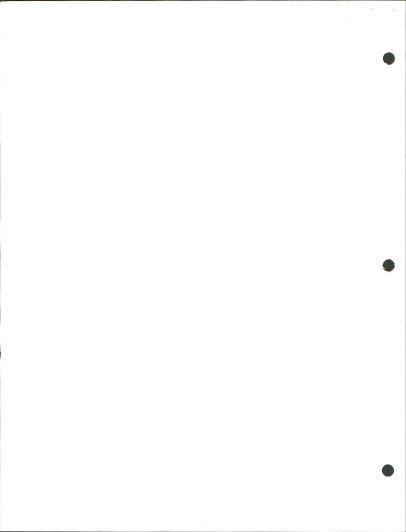


OBJECTIVES FOR INDUSTRIAL ARTS

GENERAL OBJECTIVES

To provide a sound program of industrial arts, clear, realistic objectives are essential. The following objectives are being advocated as appropriate and are believed to be unique to industrial arts:

- . Develop an insight and understanding of industry and its place in our culture:
- . discover and develop talents, aptitudes, interests, and potentialities of individuals for the technical pursuits and applied sciences:
- . develop an understanding of industrial processes and the practical application of scientific principles;
- . develop basic skills in the proper use of common industrial tools, machines, and processes:
- . develop problem-solving and creative abilities involving the materials, processes, and products of industry.

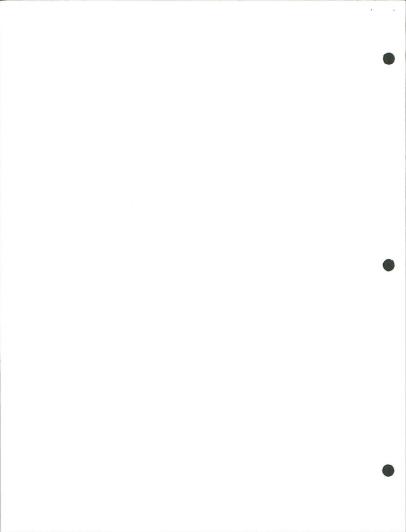


OBJECTIVES FOR K-6

Industrial arts at the elementary school level is an essential part of the education of every child. It provides for developing concepts through concrete experiences which include manipulation of materials, tools, and processes, and other methods of discovery. It includes knowledge about technology and its processes, personal development of psychomotor skills, attitudes and understandings of how technology influences society, and includes material on career exploration. It provides a basis for unifying the community and all aspects of education as equal partners in the educational process.

Suggested objectives of industrial arts for K-6 are to:

- . Meet needs to build, construct, and express oneself creatively;
- . clarify, enrich and broaden the understanding of concepts through experience;
- . apply knowledge in a natural and realistic setting through planning, measuring, calculating, describing, drawing, and designing utilizing facts and skills gained in other phases of the elementary curriculum;
- , develop an increased desire to learn;
- . utilize his/her emerging problem solving skills;
- . provide socializing experiences;
- . reduce levels of abstraction as an effort to make school and learning more enjoyable;
- . develop certain behavior, attitudes and appreciations that have indirect relationships to the object produced;
- . provide the setting for occupational and career exploration.

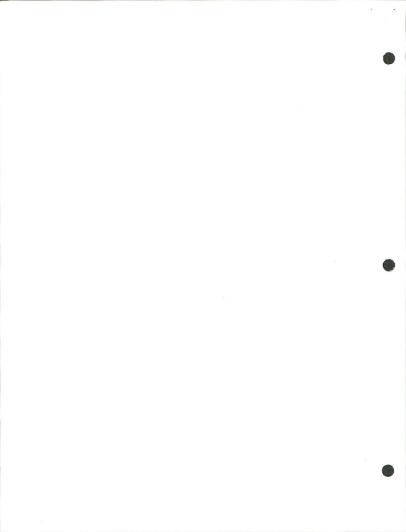


OBJECTIVES FOR JUNIOR HIGH

The junior high school industrial arts program is the most diversified of all and offers youth a variety of experiences in organized laboratories. Under the direction of specialized teachers, the students should be provided with basic exploratory experiences in using many of the tools, materials, processes, and products of the major industries. Through experiences in drafting, woodworking, metal working, industrial crafts, graphic arts, electricity-electronics, and power the student can develop an appreciation of industrial design, good craftsmanship, orderly procedures, safe work habits, and understanding of common tools, machines, and devices. The program includes opportunity for all youth in planning, experimenting and working in the major activities of industrial arts. From this type of general education program, guidance for all youth can be provided on educational, occupational, and career prospects.

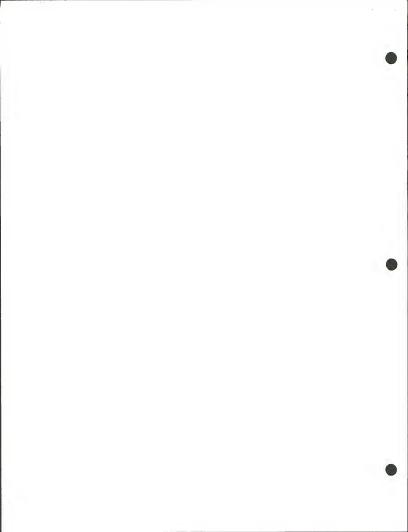
Suggested objectives for junior high industrial arts include:

- . Providing all students with the opportunity to explore industry and the world of work;
- . providing opportunities for attaining knowledge of industrial career vocations;
- . providing knowledge of avocational, hobby and leisure time pursuits:
- . providing students with the basic exploratory experiences in the use of tools, materials and processes;
- . helping develop desired social behavior patterns;
- . developing an appreciation of good design and craftsmanship;
- . promoting desirable safety habits and attitudes;
- . improving competence in selecting, buying and using the goods and services of industry.



OBJECTIVES FOR SENIOR HIGH

- . Provide for basic instruction to meet the needs of at least three types of students: (a) students exploring more deeply the avocational, cultural understanding, and consumer aspects of American industry, (b) students planning to pursue advanced study and careers in areas such as the applied and technical sciences, and (c) those who will be entering the labor force before graduation or immediately thereafter:
- provide practical situations related to the industrial world of work along with understandings of the competitive nature of industry and business;
- . provide basic skills which are useful in a variety of occupations or for occupational adjustment.



SCOPE AND SEQUENCE OF INDUSTRIAL ARTS

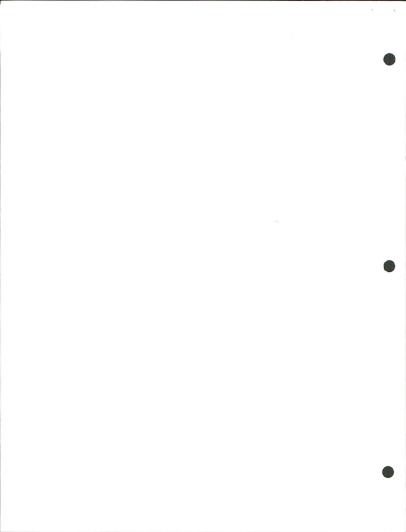
To put the whole boy or girl to school as endorsed by Dr. Calvin M. Woodward is as valid today as when it was stated in 1885. Industrial arts has the know-how and tools to do just that. In our rapidly changing, complex technological society, it is a challenging task to educate the total person, one that demands an ever alert group of concerned citizens. It is advantageous to assess periodically the present effectiveness of industrial arts education and at the same time, to reflect on its past and future.

There is little need to document how technology has transformed our lives during the post World War II era. Changes affecting all walks of life have brought new considerations in our interpretation of industrial arts and its place in our total educational scheme. Assisting people to cope with all of this change is no menial task. It focuses upon the fact that industrial arts must be evaluated to determine what from the past must be saved and what changes must temper and help redefine our present situation. These changes are being brought about by new technologies, social attitudes, environmental considerations, national priorities, and concern for the individual, regardless of race, exc, physical or mental state, or age.

Exactly what is to be expected of industrial arts, now and in the years to come? As the objectives of this guideline point out, industrial arts will enable students at all levels to develop an understanding about the technical, consumer, occupational, recreational, organizational, managerial, social, historical, and cultural aspects of industry and technology. The students acquire technical knowledge and competencies through creative and problem-solving experiences involving such activities as experimenting, planning, designing, constructing, evaluating, and using tools, machines, materials and processes.

Industrial arts has long sought to teach careers as an integral part of its curriculum, but recently even more emphasis has been given to the concept. Career education has been tempering recent industrial arts thinking in a variety of ways. Career choices, which are among the major decisions in our lifetime, must be intelligently made. All too often chance plays a big part in career choices which so greatly affect an individual. Opportunities of exploration, evaluation, sampling, and discovering lead to freedom in making career choices. Industrial arts can play a vital role in assisting the individual in major life decisions.

Industrial arts fits well into the career education concept and can do much in enhancing student opportunities in this regard. The industrial arts student learns to successfully develop, discover, and understand his talents, attitudes, and interests as they relate to his or her future career decisions. Industrial arts has long had as its focal point the study of industry. In this framework, careers just naturally fall in place when the students explore topics such as transportation, manufacturing, construction, power and communications. By having experiences with plastics, wood, metal, ceramics, and leather, new horizons are opened to the learner. Industrial processes including planning, designing, constructing, organizing, controlling, producing, operating, and servicing expose the student to a multitude of experiences that can relate to the world of work.



The sequence of an industrial arts program will depend on the maturity of the student at each level, his chronological age, and physical development. Let us follow through with this and look at the instructional patterns at the elementary, junior high (early adolescent) and high school.

ELEMENTARY INDUSTRIAL ARTS

The elementary school industrial arts program helps children become oriented to our industrial and technological environment. The program aids in the development of self-expression, personal competency, and discovery of interests and abilities. Appreciation of the American culture as it has been influenced by technology becomes evident in students. As a consumer of goods, the recipient of the elementary program learns about making wise decisions when it comes to buying goods and services. Wholesome activities to make increasing leisure time more enjoyable and fulfilling is important. Learning how a fellow man earns a living in each of the many occupations of the industrial technology is a most worthwhile goal for the students. Finally, elementary industrial arts acquaints young people with the tools, machines, and processes through which man is able to use the resources of the globe to his advantage.

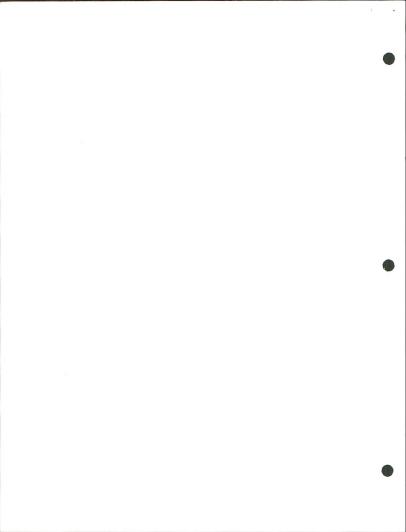
When discussing industrial arts of the elementary school level, the following statements are basic to many scholars:

- (1) Industrial arts is a subject matter discipline to be studied in the elementary grades, and it deals with the technological aspect of our environment and its effects on daily living.
- (2) All preparation for living in our contemporary society is related. Consequently, all learning should be related at the elementary school level. This, then, indicates that industrial arts the study of technology should be related to all units within the curriculum.
- (3) The teaching of elementary industrial arts should be a conscious effort to identify the elements of industry in units of study in the various curriculum areas and to make a positive attempt to teach children about these facets of our technological society.
- (4) Elementary industrial arts is appropriately taught with other subjects, within units of study, or when it is taught separately but correlated with other subjects.

Elementary school industrial arts methods and techniques represent an appealing approach to learning for young people. The ability to create and express themselves opens doors to many avenues of learning. Youngsters are basically inquisitive individuals and industrial arts can give them opportunities to learn by doing. What is often abstract and hard to conceive can be more easily grasped by manipulative hand on activities.

A key to understanding the "world of work" is giving young people opportunities to develop career awareness. Programs to introduce the many kinds of industrial technical jobs and how these are interrelated give substance to the elementary industrial arts program. Appreciation for the many work skills and the dignity of work are valuable outcomes of this age level. It is unlikely that there is a more critical period in a young student's education than during the early grades. Depriving a youngster of the industrial arts program at this time is doing him a very real injustice.

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JUNIOR HIGH OR MIDDLE SCHOOL INDUSTRIAL ARTS

Industrial arts for the twelve to fourteen year old (early adolescent) in grades seven, eight, or nine has become the cornerstone of the program. Boys or girls in this age-grade bracket are expanding their horizons in all directions and becoming more aware of the world around them. Partially because of this, the school curriculum becomes more departmentalized and subject matter is taught in more depth and breadth.

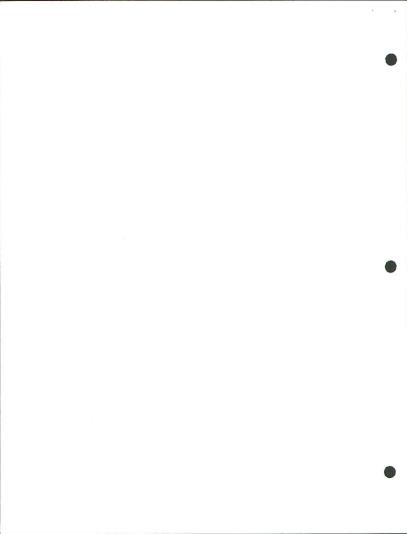
The best description of industrial arts at this level is diversity. The program, whether labeled traditional or contemporary, has a larger enrollment during these grades than at any other time. Students will be offered a variety of learning experiences in laboratories more commonly called "the shop."

Many learning areas will be covered. However, drawing from the traditional past, the most common four areas are general industrial arts, general woods, drafting, and general metals. Gaining more recognition and prominence are power mechanics, graphic arts, electricity/electronics, and crafts, which might include plastics, leather, lapidary, and art metals. Course content, centering around the worlds of construction and manufacturing, is becoming a more viable force in the junior high curriculum.

These programs are used as a means of imparting knowledge of how our technology effects our lives. Breadth, rather than depth, is the major concern. This will allow for the student to have valuable experiences that will assist him to understand others and himself in a better manner. His interests, needs, and abilities will be explored. Creative activities utilizing a variety of tools, materials, processes, and products of industry will give him many new experiences. These experiences may open a new door by creating a hobby (an avocation) which might be of a short term or life long. This can be an extremely important aspect of a person's well-being, regardless of age.

Students will benefit by learning safe work habits which will carry over into all activities of life, particularly those resulting as our society becomes more mechanically complex. The planning involved in industrial arts shows them how to approach the many technical problems encountered in life in the most systematic and timesaving manner. Man has always held in high esteem the constructive efforts of mankind - accomplished by skillful use of tools, materials, and processes. Industrial arts allows the young person to develop a strong feeling for good design and craftsmanship. Recognizing a quality product is very important to the consumer of today's products. Skill emphasis has always had a high priority in industrial arts. Knowing how to successfully complete a task requires a competency with the right tools and materials. This develops coordination between the mind and the body.

Many subject areas like mathematics, the sciences, social studies, and English can be made more relevant as a student sees its relationship to hands-on activities. It becomes more apparent that the activities of society are interrelated. Working with fellow students becomes a lesson in sharing and cooperation, an important ingredient in our present way of life. No matter what approach to teaching industrial arts is used, broad exploratory experiences allow the person to scan a wide horizon. From this, it will be realized that many people earn their living working with many of the same tools,



processes, and materials used in the school shop. A unique group of careers are exposed.

Career education through industrial arts occurs naturally at this level. The student's career awareness is more acute. The ability to orient himself to see how the many jobs interrelate for a smooth running society becomes more obvious. He in turn can relate more accurately to a career and find a personal direction that is likely to be realistic to the individual's abilities, interests, and aptitudes. Orientation to some careers is now not so much a matter of chance, but has a firm, solid foundation to rest upon. The early adolescent has much to gain from a strong, well-developed industrial arts program.

HIGH SCHOOL INDUSTRIAL ARTS

Exploration and preparation become key words in the high school industrial arts program. The student can benefit immensely from a well structured and forward looking curriculum. There should be ample opportunity for all members of the student body taking industrial arts courses to help them make career decisions, particularly those related to our industrial life. More insight into self can be an outcome of the learning situations available. Likes, dislikes, abilities, aptitudes, potential, and limitations can be explored, providing for making realistic decisions after high school.

The study of industry provides the understanding necessary for the student to cope with our complex society. Today's young people are helping to make important decisions on how technology is going to effect their lives. By understanding how technology functions, how it effects our lives through its products and processes, and how it creates job opportunities, they can make decisions that are most helpful to them and the total population.

Equally important to an individual is the need to become a consumer who is able to evaluate the products of industry. How the product can give the buyer the best value, the safest use, the longest service and the best maintenance for his money, becomes more understandable to the student through his industrial arts experiences.

The well structured industrial arts high school program should allow for two basic avenues of approach. The first avenue allows for opportunities for course samplings of perhaps half year or full duration in courses that relate to construction, transportation, communications, lapidary, ceramics, drafting, electricity/electronics, graphic arts, metals, power/automotive mechanics and woods. After sampling as many of these programs as possible the student could gain more depth by taking advanced courses of longer duration in areas that fit his interests. Whether or not this total program will provide him with job entry skills will depend on his ability and the depth of the specific areas of specialization offered by the school.

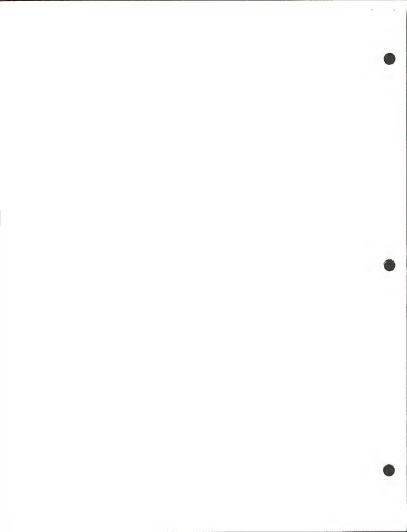
The industrial arts program will not only do a commendable job in career orientation, exploration and preparation, but will allow the student to:

(1) Communicate through the language of industry, drafting - which is a foundation subject of many areas in industrial arts.



- (2) Systematically solve problems of living that require constructional activities and tool use skills necessary for maintaining a home, working for charitable endeavors, and finding part time jobs.
- (3) Develop an appreciation for the works of man around him be they utilitarian, day-to-day functional objects, or of more esthetic, abstract types.
- (4) Have ample opportunity to elect industrial arts courses which can make the abstract more concrete by applying the principles of science and mathematics through experimentation with new materials, processes, ideas and designs.
- (5) Develop leisure time activities of many varieties which become increasingly important as work weeks become shorter and retirement comes earlier.
- (6) Benefit from the safe and proper use of and knowledge about tools, materials, and processes.

A well balanced industrial arts program can be beneficial and rewarding to the high school student, whether boy or girl. The program can reach the person having physical or psychological learning difficulties, the middle of the road individual who can move at his own pace and feel the rewards of accomplishments, and the gifted individual able to reach out into areas heretofore not attained by him. The properly supported, structured, and staffed industrial arts program represents a valuable learning experience which teaches the whole girl or boy.



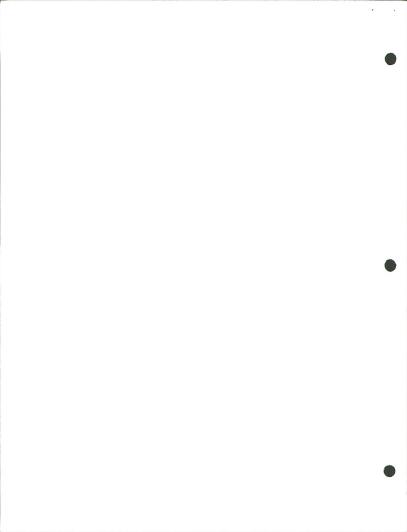
REQUISITES OF QUALITY INDUSTRIAL ARTS

THE TEACHER

For any industrial arts program to be successful in achieving its intended purpose, industrial arts teachers must be well prepared. This preparation must include course work that will help them to develop the philosophy necessary for them to carry out current educational objectives.

The classroom teacher is usually responsible for planning and executing the industrial arts experiences at the elementary school level. Therefore the educational background of this person should be such that he or she has a basic understanding of the philosophy of industrial arts and some knowledge of skills and materials that are most appropriately used at the elementary level. Often the classroom teacher is assisted by either the establishment of separate facilities within the school that is staffed with a fully trained industrial arts teacher or there may be available the services of an industrial arts teacher, consultant or supervisor who makes regular scheduled visits to help the classroom teacher.

At whatever level the industrial arts teacher functions, he or she must have sufficient knowledge of skills and materials to perform efficiently. At the elementary level the minimum should be a minor while at the junior and senior high school level the minimum should be a major in industrial arts.



THE PROGRAM

The goals and objectives of industrial arts must be clearly defined and thoroughly understood before any attempt to develop new programs or expand existing programs is undertaken. A close review of the needs and nature of our local and national industrial society must be conducted before new programs are developed. Any expansion of current programs requires close scrutiny as to how well they are serving their intended purpose before expansion can be properly planned.

Close cooperation is necessary with those involved in any aspect of career and vocational education. At the elementary level, an industrial arts program is usually structured to enrich the other disciplines. The elementary classroom teacher should assume responsibility for integrating the industrial arts activities.

In the junior high or middle school, the industrial arts program blossoms out on its own and the program should provide the student a broad variety of experiences.

The senior high school program should provide for expansion of experiences in areas of industrial arts that have not been included at the lower level and should at the same time provide more in-depth study of the previously offered areas. In schools where trade and industrial courses are offered, close cooperation between programs should enhance articulation to minimize problems as a student narrows his occupational choices and progresses to in-depth vocational experiences. Industrial arts should provide exploratory experiences with little duplication of effort.



FACILITIES AND EQUIPMENT

To be most effective an industrial arts program must have well planned facilities based upon a thorough understanding of the objectives and purposes of industrial arts.

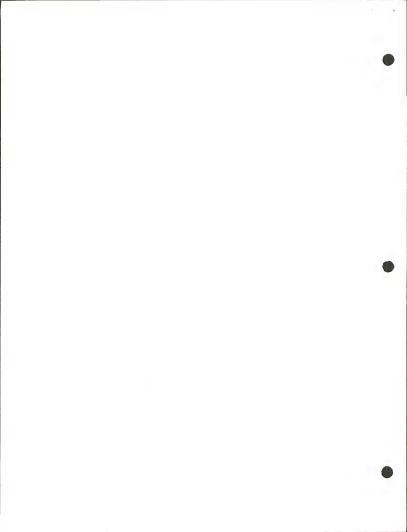
The elementary level program must have tools, materials and equipment appropriate to the elementary student's manipulative abilities. These items can either be set up in separate facilities or can be transported from classroom to classroom.

Facilities at the junior high school level are of a comprehensive shop arrangement that is designed to allow a broad variety of activities to be conducted. This type of facility is used in the medium and small size schools. A large school system operates on a unit or limited general shop approach which would necessitate several such laboratories.

A small high school where the district does not operate a junior high program would operate a comprehensive general shop where all desirable activities would be offered.

In any situation the equipment must be carefully selected on the basis of student age and performance ability. Equipment must be selected to allow the program objectives to be achieved most effectively and efficiently. Permitting available equipment to determine the curriculum is educationally unsound.

Facilities for any given program must provide adequate space for safe operation and sufficient auxiliary space to provide a safe environment.



SAFFTY

Industrial arts teachers, administrators, and school boards have a legal responsibility to provide and maintain a safe environment in which industrial arts activities must be conducted under healthful conditions.

Aspects which must be considered in providing a safe environment are physical facilities, machines, tools, and procedures. Physical facilities include such items as adequate lighting, ventilation, dust and fume collection, proper storage facilities, adequate and properly installed utilities, waste disposal and many other such items.

Machine and tool selection should be appropriate to the age level and physical performance ability of the students. Machines must have adequate disconnects guards, shields, and safety devices for the protection of the operator and others in the shop. Tools must be properly maintained in sharpness and other appropriate working conditions.

Industry must comply with the standards of the Occupational Safety and Health Act so it is only right that as we interpret industry to our students, we adhere to the same standards.

Industrial arts teachers must, for the protection of their students, their own protection, and the protection of their school systems, exercise every precaution to make certain that students are not involved in accidents. These precautions must include not only the elimination of physical and environmental hazards but also provide for appropriate instruction in safe practices in use of tools, machines and general shop conduct.

The teacher must explain how certain safe practices of the shop relate to other daily activities of the student both in and out of school. Safety training and education must be made an integral part of every task performed in the school laboratory. A plan of safety instruction geared to all shop activities will not only help the student work more efficiently and be aware of safe practices as they apply to his daily living but will aid in protecting the teacher and school system from legal actions claiming negligence.

Not only should a well planned safety program include safety instruction but it should also include a method of evaluating the student's understanding of this instruction. Appropriate safety tests given to all students will make it possible for the teacher to evaluate his safety instruction and cause each student to acknowledge his understanding of safe shop conduct. These tests will also furnish written proof that safety instruction has been given.

The new constitution of the State of Montana has abrogated common law immunity and therefore allows the administration and the school board to be sued in case of an accident to a student. This does not in any way take responsibility off the teacher as he can still be found negligent and held liable for student injury.



SELECTED ASPECTS OF ORGANIZATION AND ADMINISTRATION

CLASS SIZE AND TEACHER LOAD

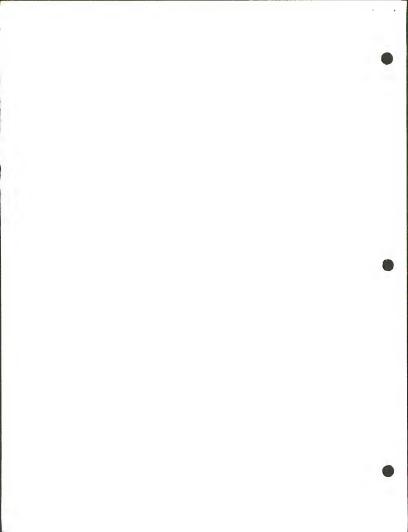
The well organized industrial arts lab begins with having one that is not overcrowded.

- A. Eighteen pupils maximum load
- B. Sixteen desirable in lab situation
 - 1. Per-Student Area
 - a. Heavy equipment labs (wood, auto, machine, etc.)
 - 1. Minimum area 75 sq. ft.
 - 2. Adequate " 100 sq. ft.
 - 3. Desirable " 125 sq. ft.
 - b. Light equipment labs (electricity, drafting, Jr. high metals)
 - 1. Minimum area 50 sq. ft.
 - 2. Adequate " 60 sq. ft.
 - 3. Desirable " 75 sq. ft.
 - c. Classrooms (related subjects)
 - 1. Minimum area 18 sq. ft.
 - 2. Adequate " 24 sq. ft.
 - 2. Management Details:
 - a. Roll call and personnel plan
 - b. Tool checking
 - c. Material issue
 - d. Production
 - e. Planning and reference material
 - f. Safety education
 - g. Ventilation
 - h. Finishing room
 - i. Sanitation and cleanup procedure
 - j. Public relations

BUDGETARY PRACTICES

Teachers involved in planning budget study in detail the lists of supplies appropriate to achieving objectives, room space available, funds provided, methods of purchase and method of issuing supplies.

- A. Budget estimating practices
 - 1. Buy quantities in large amounts to last a year
 - Consider storage capabilities
 - 3. Divide budget into four categories

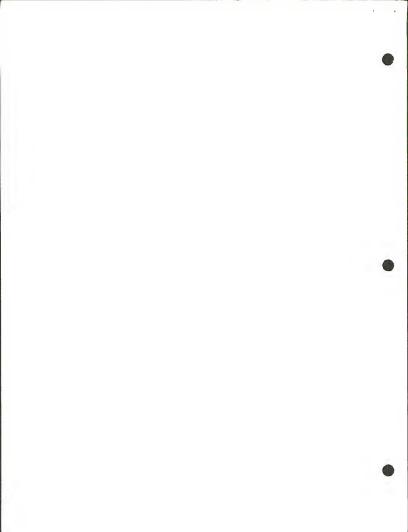


- a. Consumable supplies
- b. Repairs and maintenance
- c. New equipment purchases
- d. Salaries and wages
- 4. Have contingency fund for emergencies (5% of total)
- B. Items of expenditures
 - l. Materials
 - 2. Equipment
 - 3. Repairs
 - 4. Services
- C. Income from
 - 1. Pupil fees
 - 2. Sales of projects
 - 3. Sales of obsolete equipment

RECORD KEEPING

Records are necessary to the proper operation day by day in an industrial lab. They are a ready reference system to the inner workings of each shop operation.

- A. Type of records needed
 - 1. Those required by superintendent and principal
 - 2. Those needed by shop administrator
 - a. Staff personnel records
 - b. Pupil personnel records
 - c. Financial records
 - d. Materials and equipment records
 - e. Temporary records
 - (1) Time record
 - (2) Parts order
 - (3) Receipt form
 - (4) Tool loan slip
 - (5) Material bill
 - (6) Work record
 - (7) Job plan sheet
 - (8) Project evaluation sheet
 - (9) Trip tickets (for departments with vehicles)
- B. Continuous inventory
 - 1. Inventory of tools and equipment
 - 2. Supplies
 - 3. Furniture



C. Determining depreciation

$$\frac{\text{original cost (o.c.) - scrap value (s.v.)}}{\text{estimated life (e.l.)}} = \text{yearly depreciation}$$

ACCOUNTING PROCEDURES

Various forms are necessary in accounting for the numerous supplies needed to carry on work in a school shop.

- A. Supplies, expendable
 - 1. Hardware
 - 2. Software
 - 3. Lumber, metal, etc.
 - 4. Screws, bolts, nails, rivets, etc.
- B. Capital
 - 1. New machines
 - 2. New tools
 - 3. Buildings
 - 4. Improvements, i.e., remodeling
- C. Maintenance
 - 1. Miscellaneous repairs-physical plant
 - 2. Machine and tool repairs
 - 3. Routine upkeep
- D. Revenue
 - 1. Shop fees
 - 2. Materials charge
 - 3. From work orders



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